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MEMORANDA ON THE MAYA CALENDARS USED IN THE BOOKS OF CHILAN BALAM

BY

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(From the American Anthropologist (N. S.), Vol. 3, January–March, 1901)

NEW YORK
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MEMORANDA ON THE MAYA CALENDARS USED IN THE BOOKS OF CHILAN BALAM

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Dr Brinton, in his *Maya Chronicles*, has translated the following passages from the Book of Chilan Balam of Mani:

. . . in the thirteenth Ahau Ahpula died; for six years the count of the thirteenth Ahau will not be ended; the count of the year was toward the East, the month Pop began with (the day) fourth Kan; the eighteenth day of the month Zip (that is) 9 Ymix, was the day on which Ahpula died; and that the count may be known in numbers and years, it was the year 1536.

And again from the Book of Chilan Balam of Tizimin:

The thirteenth Ahau; the death of Ahpulha took place; it was the sixth year when ended the count of the thirteenth Ahau,— the count of the year was from the east (the month) Pop passed on the fourth Kan; on the eighteenth of (the month) Zip, 9 Imix was the day Ahpulha died; it was the year 1536.

In his remarks on these books Dr Brinton says:

According to the reckoning as it now stands, six complete great cycles were counted, and parts of two others, so that the native at the time of the Conquest would have had eight great cycles to distinguish apart.

I have not found any clear explanation how this was accomplished. We do not even know what name was given to this great cycle,[1] nor whether the calendar was sufficiently perfected to prevent confusion in dates in the remote past.

It would seem, however, as if the reckoning of time as given in these books is very accurate, fixing a date which would not be

[1] It should be noted that the grand cycle, which Dr Brinton refers to, is the period of 13 x 7200 days = 93,600 days or 260 periods of 360 days; while the grand cycle according to Goodman's method is 13 x 144,000 days or 5200 periods of 360 days.

duplicated within a limit of thirty-five hundred or four thousand years.

The Books of Chilan Balam number the katuns on a different principle from that used on the inscriptions or in the Dresden Codex, but the two methods can be readily and usefully brought together, as the katun itself remains the same in both methods. In the inscriptions the katuns are numbered from 0 to 19, using Goodman's method though not his exact nomenclature, and twenty of them equal one cycle. In the Chilan Balam books, the katuns are named as Katun 13 Ahau, Katun 11 Ahau, etc., these being the days with which they begin or with which the previous katun ended; and as after thirteen katuns the same name is again given, this nomenclature fixes a date within a period which equals 13 multiplied by the number of days in a katun. There has been a difference of opinion as to this number of days in a katun, but it is clear from the Books of Chilan Balam that their reckoning was by terms of 20 x 360 days. The followers of Perez, however, insist that the length of the katun was 24 x 365 days. Sr Perez has indeed made this assertion,[1] but he rests his opinion to a great degree on the fact that the naming of the katuns proceeded in the following order, taking their names from the day Ahau with which they began, viz.:

Katun 13 Ahau,
Katun 11 Ahau,
Katun 9 Ahau,
Katun 7 Ahau, etc.,

and that by starting with a katun which begins with 13 Ahau and counting forward a period of 24 x 365 days, we should reach another katun beginning with 11 Ahau. But the same result is brought about by considering the katun as a period of 20 x 360 days, as has been shown by Dr Seler, among others; and since the Books of Chilan Balam state distinctly that they reckon by so

[1] Stephens, *Incidents of Travel in Yucatan*, p. 441 et seq.

many scores of so-called years, and as the initial dates of the inscriptions all reckon in the same way, it is now generally considered that the katun consisted of 20 x 360 or 7200 days. An objection to considering a katun as 20 x 360 days may be raised in that the Books of Chilan Balam use the word "año" or year, but this can be easily explained by the fact that the Spanish "year" was the period which most nearly agreed with their tun or 360-day period, and that the Books did not pretend to speak with scientific accuracy.

Besides the above count, it is well known that the Mayas had a year-and-month count. This consisted in naming each one of the twenty days and in attaching to each of these days one of the numbers 1 to 13. Besides this, each day so numbered was declared to be a given day of a given month and to occur in a year marked by one of the year bearers—as for instance in the Book of Chilan Balam, already quoted, where the day is given as 9 Ymix 18 Zip in the year 4 Kan. Now this day and this year could recur only after the lapse of fifty-two years or 18,980 days.

It should be noted here that in the inscriptions and in the Dresden Codex, the day Ymix was always the day 4, 9, 14, or 19 of any month, showing that the day 1 of the month was Eznab, Akbal, Lamat, or Ben; while in Landa and the Books of Chilan Balam the day Ymix was the day 3, 8, 13, or 18, showing that the day 1 of the month was Cauac, Kan, Muluc, or Ix. That is, the months in modern times began with the day which followed the day with which the months began in more ancient times. As the tables are calculated for the inscriptions, it will be well, in order to facilitate our calculations, to call the day on which Ahpula died the nineteenth of the month Zip, instead of the eighteenth of that month.

Given that the katun consisted of 7200 days, a Katun 13 Ahau could not recur until after the lapse of 13 x 7200 or 93,600 days, and the recurrence of any day marked by the year-and-month count, and occupying any particular place in a given katun, could

not occur until after the lapse of a period which is found by finding the least common multiple of the two numbers 93,600 and 18,980. This is 6,832,800 days, which is a period of 360 calendar rounds of 18,980 days or of 52 years each. This is equal to 18,720 years, and, in the method of reckoning shown in the initial dates of the inscriptions, would equal 3 grand cycles, 8 cycles, and 9 katuns, or, to use the method of Goodman, 3.8.9.0.0.0.

I have said that a day marked by the year-and-month count, and occupying any particular place in a given katun, could not recur until the lapse of this long period. This would be true if the day was specified as being a given day in a given tun in a given katun, or even if the day was stated as falling in a given uinal of a given tun in a given katun. But in the case before us the death of Ahpula is said to have taken place in the Katun 13 Ahau when six tuns or years of that katun remained unexpired. Even with this rather loose designation such a day would not recur within a period of 3500 or 4000 years.

The day 4 Ahau 8 Cumhu seems to have been regarded as the beginning day of the beginning cycle of some grand cycle. From this day all the initial series of the inscriptions of Copan and Quirigua, of Piedras Negras and Tikal, so far as we know them, count, except one where this day 4 Ahau 8 Cumhu is itself given. In this place (on Stela C of Quirigua) 4 Ahau 8 Cumhu is reckoned thus: "Grand cycle glyph .13.0.0.0.0.", while in the Temple of the Cross it is declared to be a thirteenth cycle. As this was the beginning date, there is reason to believe that the beginning cycle of a great cycle received the number 13.

I give here the first and last terms of a list of the beginning days of the Katuns 13 Ahau in a complete round of 18,720 years occurring after the beginning of the grand cycle called by Goodman Grand Cycle 54, which began with 4 Ahau 8 Cumhu. It is of little consequence what particular number is given to the grand cycle, as the whole series forms a continuous count, and I

shall therefore follow Goodman, who gives the number 54 to the grand cycle glyphs common to Copan, Quirigua, etc.

If 54.13.0.0.0.0. or the beginning of the grand cycle, called Grand Cycle 54 by Goodman, begins with 4 Ahau 8 Cumhu, a Katun 13 Ahau will appear two katuns after this or with the count of

54.13.2.0.0.0. 13 Ahau 8 Mol Year 10 Ix,

and other Katuns 13 Ahau will follow at intervals of 13 katuns as here given:

54.13.15.0.0.0.	13 Ahau	8 Pax	Year 6 Ix.
1. 8.	"	3 Xul	3 Cauac.
2. 1.	"	3 Kankin	12 "
. . . . .			
57.5.19.0.0.0.	13 Ahau	18 Ceh	11 Kan.
6.12		13 Uo	8 Muluc.
7. 5.		13 Yax	4 "
18.		13 Cumhu	13 "
57.8.11.0.0.0.	13 Ahau	8 Mol	10 Ix.

But we are seeking a Katun 13 Ahau in which 14 tuns have elapsed and of which 6 tuns still remain unexpired. We must, therefore, add 14 tuns or 14 x 360 days = 5040 days to each of the dates given and we shall then have the following complete list of the beginning days of Tun 14 of Katun 13 Ahau for the term of 18,720 years:

54.13. 2.14.0.0.	9 Ahau	18 Zotz	11 Kan.
15.		18 Ceh	7 Kan.
1. 8.		13 Uo	4 Muluc.
2. 1.		13 Yax	13 Muluc.
14.		13 Cumhu	9 Muluc.
3. 7.		8 Mol	6 Ix.
4. 0.		8 Pax	2 Ix.
13.		3 Xul	12 Cauac.
5. 6.		3 Kankin	8 Cauac.
19.		18 Zip	5 Kan.
6.12.		18 Zac	1 Kan.
7. 5.		13 Pop	11 Muluc.

18.	13 Chen	7 Muluc.
54. 8.11.14.0.0.	13 Kayab	3 Muluc.
9. 4.	8 Yaxkin	13 Ix.
17.	8 Muan	9 Ix.
10.10.	3 Tzec	6 Cauac.
11. 3.	3 Mac	2 Cauac.
16.	18 Uo	12 Kan.
12. 9.	18 Yax	8 Kan.
55.13. 2.14.0.0.	18 Cumhu	4 Kan.
15.	13 Mol	1 Muluc.
1. 8.	13 Pax	10 Muluc.
2. 1.	8 Xul	7 Ix.
14.	8 Kankin	3 Ix.
3. 7.	3 Zotz	13 Cauac.
4. 0.	3 Ceh	9 Cauac.
13.	18 Pop	6 Kan.
5. 6.	18 Chen	2 Kan.
5.19.	18 Kayab	11 Kan.
6.12.	13 Yaxkin	8 Muluc.
7. 5.	13 Muan	4 Muluc.
18.	8 Tzec	1 Ix.
8.11.	8 Mac	10 Ix.
9. 4.	3 Zip	7 Cauac.
17.	3 Zac	3 Cauac.
10.10.	3 Uayeb	12 Cauac.
11.03.	18 Mol	9 Kan.
16.	18 Pax	5 Kan.
12. 9.	13 Xul	2 Muluc.
56.13. 2.14.0.0.	13 Kankin	11 Muluc.
15.	8 Zotz	8 Ix.
1. 8.	8 Ceh	4 Ix.
2. 1.	3 Uo	1 Cauac.
14.	3 Yax	10 Cauac.
3. 7.	3 Cumhu	6 Cauac.
4. 0.	18 Yaxkin	3 Kan.
13.	18 Muan	12 Kan.
5. 6.	13 Tzec	9 Muluc.
5.19.	13 Mac	5 Muluc.
6.12.	8 Zip	2 Ix.

7. 5.	8 Zac	11 Ix.
18.	3 Pop	8 Cauac.
8.11.	3 Chen	4 Cauac.
9. 4.	3 Kayab	13 Cauac.
17.	18 Xul	10 Kan.
10.10.	18 Kankin	6 Kan.
11.03.	13 Zotz	3 Muluc.
16.	13 Ceh	12 Muluc.
12. 9.	8 Uo	9 Ix.
57.13. 2.14.0.0.	8 Yax	5 Ix.
15.	8 Cumhu	1 Ix.
1. 8.	3 Mol	11 Cauac.
2. 1.	3 Pax	7 Cauac.
14.	18 Tzec	4 Kan.
3. 7.	18 Mac	13 Kan.
4. 0.	13 Zip	10 Muluc.
4.13.	13 Zac	6 Muluc.
5. 6.	8 Pop	3 Ix.
5.19.	8 Chen	12 Ix.
6.12.	8 Kayab	8 Ix.
7. 5.	3 Yaxkin	5 Cauac.
18.	3 Muan	1 Cauac.
8.11.	18 Zotz	11 Kan.

The only places where a year 4 Kan appears are at the dates

55.13. 2.14.0.0.[1]	9 Ahau	18 Cumhu	Year 4 Kan, and
57. 2.14.14.0.0.	9 Ahau	18 Tzec	Year 4 Kan.

But as the words used are that 6 years (or tuns) remained before the end of the katun, and as a slightly longer time than just 6 tuns may have remained, and as the month Zip in which the death of Ahpula occurred is the third month of the year and so is near the beginning of the year 4 Kan, it is quite possible that the beginning of the Tun 14 may have been in the latter part of

[1] It is necessary to remember that, by Goodman's methods, these figures represent periods of past time. Thus the number 2 of the katun means that 2 katuns have passed, and that the current katun is what we should call the third; and that 0.0 means that a full count of uinals and kins has occurred and that the current uinal and kin are what we should call the first.

the preceding year, in which case, in addition to the preceding dates, the following date might be the one which we are seeking:

55. 9.17.14.0.0. 9 Ahau 3 Zac Year 3 Cauac.

As 9 Ymix 19 Zip is said to be in the year 4 Kan, we shall find this date before the dates of the beginning of Tun 14 in the first two cases and after the beginning of Tun 14 in the last case. This date of 9 Ymix 19 Zip will then be numbered thus, placing the three dates in consecutive order:

1) 55.13. 2.13. 3. 1. 6 tuns 299 days to end of Katun 13 Ahau.
2) 55. 9.17.14.11. 1. 5 " 139 " " " "
3) 57. 2.14.13.16. 1. 6 " 39 " " " "

In no one of the cases is the date 9 Ymix 19 Zip exactly 6 tuns before the end of the Katun 13 Ahau, but it is possible that the annalist took no account of fractions of tuns, either in excess of the 6 tuns or otherwise. Thus in the first and last cases of the three, as first given, he may have said to himself, "There are but 6 whole tuns remaining of the katun and I will call it 6," or in the second case he may have said: "There are 5 tuns remaining and 139 days besides; I will call it 6 tuns." Whichever was the plan he followed, we can have at present no means of ascertaining except from the results which we obtain by calculation.

The date found on Stela 9 of Copan, which is the earliest date of these stelæ of that place, in which the numbers preceding the period glyphs are given by the line-and-dot method, is 54.9.6.10.0.0. This precedes the above dates by the following periods:

1) 0.3.16.3. 3.1. = 548,341 days = 1,502 years 111 days.
2) 1.0.11.4.11.1 = 1,952,861 " = 5,350 " 14 "
3) 2.6. 8.3.16.1 = 4,667,001 " = 12,786 " 111 "

If, now, we accept the first date of 55.13.2.13.3.1. as the date of Ahpula's death, we shall have the date of Stela 9 of Copan as A.D. 34, since the death occurred in 1536. If we accept the second

date, 55.9.17.14.11.1., as the true one, Stela 9 must represent a date of B.C. 3814, and in the case of the third date, 57.2.14.13.16.1. in which the period to elapse to the end of Katun 13 Ahau is the nearest to an exact 6 tuns, we should throw back Copan to B.C. 11,250. It is not probable, however, that either of the last two dates is correct, both because of the immense time which would have elapsed and because the monuments show signs of no such age. We are therefore left to the date A.D. 34 as the probable date of the earliest stela of Copan which we know of at present.

The following table gives the earliest and latest dates in Copan and Quirigua as far as we know them, together with the dates of our calendar corresponding thereto, on the supposition that the above date is rightly deciphered :

Copan : Stela 9,	9. 6.10.0.0					A.D. 34.
" N,	9.16.10.0.0	= 197	years later than	A.D. 34		A.D. 231.
Quirigua : " C,	9. 1. 0.0.0	= 108 +	" earlier "	"		say B.C. 75.
" K,	9.18.15.0.0	= 241 +	" later "	"		A.D. 275.

If this is correct, Copan lasted, so far as the erection of stelæ is concerned, for about 200 years, and Quirigua for about 350 years, though of course this may be only a small part of the period of their existence.

The above calculations have been made on the supposition that the initial dates record the date of the erection of the stelæ, and on the further supposition, as has been stated, that the same principle of calculating time has been continued from the earliest ages. There is, however, some evidence that a change has been made, at least in detail. It has already been seen that the beginning day of the month has been shifted from the Eznab, Akbal series to the Cauac, Kan series of days. What difference this would have made in the relation of the year-and-month count with the long count it is impossible to say without knowing the means used to effect the change ; but it is quite likely that this relation was not affected. In the Book of Chilan Balam of Mani

is the entry: "The Thirteenth Ahau; then Pop was counted in order." And in the Book of Chilan Balam of Chumayel we find, "The Thirteenth Ahau; Pop was set in order." This statement occurs in the early part of the chronicle, and the calculation of the Ahaus goes on after it in exactly the same way as before it. This setting in order of Pop would not then seem to have made any difference in the long count. At least it is very probable that it means merely that the seasons and the calendar were made to agree.

Dr Brinton (*Maya Chronicles*, p. 85) also gives a translation of a part of the Codice Perez, which refers to the "Doubling of the Katuns." The statement is very obscure, but only tends to show that while the counting of the katuns was carried on as in the Books of Chilan Balam, the first of the series was called Katun 8 Ahau instead of Katun 13 Ahau, while the last of the series was Katun 10 Ahau. This would not necessarily change the consecutive order of the katuns, but might merely give a new starting-point.

While, therefore, it is impossible to say what change, if any, was made in the reckoning of time, it may be said that there is no evidence at present to show that the old relation of the long count to the year-and-month count and to the count of the Books of Chilan Balam did not continue to the time of the arrival of the Spaniards. Moreover, the date of A.D. 34 for the monuments of Copan and Quirigua is by no means unlikely to be the true one. At all events the above discussion of the reckoning will not be useless if it succeeds in bringing out new facts, and no one will be more ready to recognize any new evidence than I shall be, even if the above deductions shall be shown to be erroneous.

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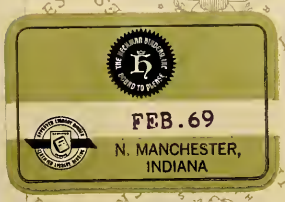
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